Bhavna Arora

Energy Geosciences Division
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Education

Texas A&M University, College Station, TX 2006-2012
Ph. D., Water Management & Hydrologic Sciences

Indian Institute of Technology (IIT), Kharagpur, India 2001-2006
M. Tech., Water Resources Development & Management
B.Tech. (Hons), Agricultural & Food Engineering
Minor, Mathematics & Computing

Professional Positions

Geological Research Scientist, **Lawrence Berkeley National Laboratory**	2017-Present
Postdoctoral Fellow, **Lawrence Berkeley National Laboratory**	2012-2017
Research & Teaching Assistant, **Texas A&M University**	2006-2012
Intern, **Jumbo International**	2004-2004
Intern, **Indian Agricultural Research Institute**	2003-2003

Grants & Proposals

PI, Laboratory Directed Research and Development Grant, Lawrence Berkeley National Laboratory ($190,000). Collaborators: Sergi Molins (Co-PI), David Trebotich, Jonathan Ajo-Franklin and Carl Steefel	2015-Present
Graduate Student Research and Presentation Grant, Office of Graduate Studies, Texas A&M University ($500)	2010
TWRI Mills Scholarship, Texas Water Resources Institute ($1,500)	2009-2010
Graduate Student Council Travel Grant, Texas A&M University ($500)	2009

Honors & Awards

AAAS/Science Program for Excellence in Science Membership Award, American Association for the Advancement of Science	2012-2014
Biological & Agricultural Engineering Graduate Scholarship, Texas A&M University	2012

Bill and Rita Stout International Graduate Student Achievement Award, Texas A&M University 2011
Awarded each year to a graduate student for outstanding achievement in academics and leadership at Texas A&M University

Outstanding Student Paper Award, AGU Fall Meeting 2010

Regents' Scholarship, Texas A&M University 2010-2011

2nd place, Oral Session, Student Research Week, Texas A&M University 2009
Also presented with Interdisciplinary Research Recognition Ribbon

Regents' Scholarship, Texas A&M University 2008-2009

1st place, Poster Session, Student Research Week, Texas A&M University 2007

Institute Silver Medalist, IIT Kharagpur 2006
Awarded each year to a graduating student who secures the highest grade point among peers

A. A. Hakim Memorial Endowment Prize, IIT Kharagpur 2006
Awarded each year to a graduate student for outstanding performance in Water Resources Development and Management

Certificate of Recognition, Drip Irrigation Project, Government of India 2003

Vinod Gupta Leadership Award, IIT Kharagpur 2003

Certificate of Merit, National Scholarship Scheme, India 1999

Certificate of Excellence, Senior Mathematical Olympiad 1998

Publications

Peer-Reviewed

1. Yabusaki, S. B., M. J. Wilkins, Y. Fang, K. H. Williams, **B. Arora**, J. Bargar, H. Beller, et al., Water Table Dynamics and Biogeochemical Cycling in a Shallow, Variably-Saturated Floodplain, *Environmental Science and Technology,* DOI:10.1021/acs.est.6b04873.
2. **Arora, B.**, Y. Cheng, E. King, N. Bouskill, and E. Brodie (2017), *Chapter 27: Modeling microbial energetics and community dynamics,* in the Handbook of Metal-Microbe Interactions and Bioremediation*, In press*, CRC Taylor and Francis Group.
3. **Arora, B.**, D. Dwivedi, N. F. Spycher, and C. I. Steefel (2017), On modeling CO_2 dynamics in a flood plain aquifer, *Procedia Earth and Planetary Science*, DOI: 10.1016/j.proeps.2016.12.103.
4. Dwivedi, D., C. I. Steefel, **B. Arora**, and G. Bisht (2017), Impact of intra-meander hyporheic flow on nitrogen cycling, *Procedia Earth and Planetary Science*, DOI: 10.1016/j.proeps.2016.12.102.
5. **Arora, B.**, and B. P. Mohanty (2017), Influence of spatial heterogeneity and hydrological perturbations on redox dynamics: A column study, *Procedia Earth and Planetary Science*, DOI: 10.1016/j.proeps.2017.01.046.

6. **Arora, B.**, D. Dwivedi, S. S. Hubbard, C. I. Steefel, and K. H. Williams (2016), Identifying geochemical hot moments and their controls on a contaminated river floodplain system using wavelet and entropy approaches, *Environmental Modelling & Software*, DOI: 10.1016/j.envsoft.2016.08.005.

7. Dwivedi, D., B. Dafflon, **B. Arora,** H. M. Wainwright, and S. Finsterle (2016), *Chapter 20: Spatial analysis and geostatistical methods*, in the Handbook on Applied Hydrology, V. P. Singh (ed.), *McGraw-Hill.*

8. Dwivedi, D., **B. Arora,** S. Molins, and C. I. Steefel (2016), *Part IV, Chapter 5: Benchmarking Reactive Transport Codes for Subsurface Environmental Problems*, in Groundwater Research on Exploration, Assessment, Modelling and Management of Groundwater Resources and Pollution, D. Thangarajan and V. P. Singh (eds.), CRC Taylor and Francis Group.

9. **Arora, B.**, N. F. Spycher, C. I. Steefel, S. Molins, M. Bill, M. E. Conrad, W. Dong, B. Faybishenko, T. K. Tokunaga, J. Wan, K.H. Williams and S. B. Yabusaki (2016), Influence of Hydrological, Biogeochemical and Temperature Transients on Subsurface Carbon Fluxes in a Flood Plain Environment, *Biogeochemistry,* DOI: 10.1007/s10533-016-0186-8.

10. Mayer, K. U., P. Alt-Epping, D. Jacques, **B. Arora,** and C. I. Steefel (2015), Benchmark problems for reactive transport modeling of the generation and attenuation of acid rock drainage, *Computational Geosciences*, DOI: 10.1007/s10596-015-9476-9.

11. **Arora, B.**, B. P. Mohanty, and J. T. McGuire (2015), An integrated Markov Chain Monte Carlo algorithm for upscaling hydrological and geochemical parameters from column to the field scale, *Science of the Total Environment*, DOI:10.1016/j.scitotenv.2015.01.048.

12. **Arora, B.**, S. S. Sengör, N. F. Spycher, and C. I. Steefel (2014), A reactive transport benchmark on heavy metal cycling in lake sediments, *Computational Geosciences*, DOI: 10.1007/s10596-014-9445-8.

13. Steefel, C. I., C. A. J. Appelo, **B. Arora**, D. Jacques, T. Kalbacher, O. Kolditz, V. Lagneau, P. C. Lichtner, K. U. Mayer, J. C. L. Meussen, S. Molins, D. Moulton, H. Shao, J. Simunek, N. Spycher, S. B. Yabusaki, and G. T. Yeh (2014), Reactive transport codes for subsurface environmental simulation, *Computational Geosciences*, DOI:10.1007/s10596-014-9443-x.

14. **Arora, B.**, B. P. Mohanty, J. T. McGuire, and I. M. Cozzarelli (2013), Temporal dynamics of biogeochemical processes at the Norman Landfill site, *Water Resources Research*, *49*, 1-18, doi: 10.1002/wrcr.20484.

15. **Arora, B.**, B. P. Mohanty, and J. T. McGuire (2012), Uncertainty in dual permeability model parameters for structured soils, *Water Resources Research*, *48*, W01524, doi: 10.1029/2011WR010500. (**Note: *This publication was featured as the most accessed article for Jan-Feb 2012 in Water Resources Research***)

16. **Arora, B.**, B. P. Mohanty, and J. T. McGuire (2011), Inverse estimation of parameters for multidomain flow models in soil columns with different macropore densities, *Water Resources Research*, 47, W04512, doi: 10.1029/2010WR009451. (**Note: *This publication was a featured article in EOS, Transactions of the American Geophysical Union***)

Conference Papers and Reports

17. Wainwright, H. M., B. Faybishenko, S. Molins, J. A. Davis, **B. Arora**, G. Pau, J. Johnson, G. Flach, M. Denham, C. Eddy-Dilek, D. Moulton, K. Lipnikov, C. W. Gable, T. A. Miller, E. Baker, V. Freedman and M. Freshley (2016), Effective Long-term Monitoring Strategies by Integrating Reactive Transport Models and In situ Geochemical Measurements, *16162*.
18. **Arora, B.**, D. Dwivedi, N. F. Spycher, and C. I. Steefel (2015), Modeling carbon fluxes from a biogeochemical hotspot in a floodplain aquifer, *Proceedings of the TOUGH Symposium*, Berkeley, CA, pp. 456-463.
19. Wainwright, H. M., S. Molins, J. A. Davis, **B. Arora**, B. Faybishenko, H. Krishnan, S. S. Hubbard, G. Flach, M. Denham, C. Eddy-Dilek, D. Moulton, K. Lipnikov, C. W. Gable, T. A. Miller, and M. Freshley (2015), Using ASCEM modeling and visualization to optimize remediation strategies at F-Area Savannah River site, SC, *Proceedings of MODFLOW and More* 2015, Golden, CO.
20. Flach, G., H. M. Wainwright, S. Molins, H. Krishnan, **B. Arora**, J. A. Davis, A. Romosan, B. Faybishenko, S. S. Hubbard, M. Denham, C. Eddy-Dilek, D. Moulton, K. Lipnikov, T. A. Miller, C. W. Gable, and M. Freshley (2015), Advanced Simulation Capability for Environmental Management, Integrated toolsets and simulator to enhance public communication, *15156*, No. SRNL-STI-2015-00027.

Recent Presentations

1. **Arora, B.**, D. Dwivedi, C. I. Steefel, N. F. Spycher, P. M. Fox and P. S. Nico (2016), Mineralogical Controls on Carbon Cycling in a Floodplain Environment, AGU Fall Meeting, San Francisco, CA, Dec. 12-16, 2016.
2. **Arora, B.**, H. M. Wainwright, L. J. Smith, J. B. Curtis, M. S. Torn, and S. S. Hubbard (2016), Evaluating Temporal Controls on Greenhouse Gas (GHG) Fluxes at the Barrow site: An Entropy-based Approach, NGEE-Arctic All-Hands Meeting, San Francisco, CA, Dec. 10-11, 2016.
3. **Arora, B.** (2016), Deciphering spatio-temporal patterns and using reactive transport models to improve process understanding, Modeling Forum, Earth and Environmental Sciences Area, Lawrence Berkeley National Laboratory, Nov. 18, 2016.
4. **Arora, B.**, D. Dwivedi, N. F. Spycher, and C. I. Steefel (2016), On modeling CO_2 dynamics in a flood plain aquifer, 15th Water-Rock Interaction International Symposium, Portugal, Oct. 16-21, 2016.
5. **Arora, B.**, D. Dwivedi, M. Newcomer, E. Woodburn, N. F. Spycher, and C. I. Steefel (2016), Benchmarking integrated surface-subsurface models along a hillslope transect, SeS Bench V, A Coruña, Spain, Oct. 13-15, 2016.
6. Dwivedi, D., **B. Arora**, M. Newcomer, E. Woodburn, C. I. Steefel, and D. Moulton (2016), Modeling Integrated Surface Subsurface Water Flow and Biogeochemical Cycling in the Hyporheic Zone, SeS Bench V, A Coruña, Spain, Oct. 13-15, 2016.

7. **Arora, B.**, E. L. King, N. F. Spycher, C. I. Steefel, and M. E. Conrad (2016), Genome-informed reactive transport simulations of CO_2 and carbon isotope dynamics in a flood plain aquifer, Goldschmidt Conference, Yokohama, June 26 – July 1, 2016.
8. Dwivedi, D., C. I. Steefel, **B. Arora**, and G. Bisht (2016), How important is the hyporheic zone for large scale biogeochemical cycling?, Goldschmidt Conference, Yokohama, June 26 – July 1, 2016.
9. **Arora, B.** (2016), Modeling the impact of biogeochemical hotspots and hot moments on carbon fluxes from a flood plain site: Implications for the River Ganges cleanup, IIT Kanpur, Jan. 12, 2016 **(INVITED)**.
10. **Arora, B.**, N. F. Spycher, C. I. Steefel, E. King, and M. E. Conrad (2015), Modeling the impact of biogeochemical hotspots and hot moments on subsurface carbon fluxes from a flood plain site, AGU Fall Meeting, San Francisco, Dec. 14-18, 2015.
11. **Arora, B.** and H. M. Wainwright (2015), Floodplain functioning – Hotspots/hot moments identification and their utility for predicting system response to perturbations, SFA 2.0 Retreat, Bodega Bay, Oct. 15-16, 2015.
12. **Arora, B.**, M. E. Conrad, N. F. Spycher, and C. I. Steefel (2015), Modeling CO_2 and carbon isotope dynamics in a floodplain aquifer, Goldschmidt Conference, Prague, Aug. 16–21, 2015.
13. Dwivedi, D., C. I. Steefel, **B. Arora**, and G. Bisht (2015), Impact of hyporheic zone on biogeochemical cycling of carbon, Goldschmidt Conference, Prague, Aug. 16–21, 2015.
14. **Arora, B.**, D. Dwivedi, S. S. Hubbard, C. I. Steefel, and K. H. Williams (2015), Towards improved characterization of geochemical hot moments: A combined wavelet-entropy approach, SIAM Conference on Mathematical and Computational Issues in the Geosciences, Stanford, June 29 – July 2, 2015.
15. Yabusaki, S., **B. Arora**, N. F. Spycher, E. King, C. Steefel, and E. Brodie (2015), GEWaSC modeling of the Rifle floodplain aquifer: Hydrological, biogeochemical, and microbial controls on carbon, nitrogen, and oxygen fluxes, 2015 Environmental System Science (PI) Meeting, Potomac, Apr. 28-29, 2015.

Society & Honorary Memberships

American Geophysical Union	2008-Present
Geological Society of America	2012-Present
American Association for the Advancement of Science	2012-2015
Alpha Epsilon	2011-Present
Phi Kappa Phi	2011-2015

Service & Synergistic Activities

Peer Reviewer for the Following Journals

- Computational Geosciences, Environmental Chemistry, Environmental Modelling & Software, Environmental Science: Processes & Impacts, Journal of Environmental Quality, Journal of Geophysical Research: Biogeosciences, Journal of Hydrology, Vadose Zone Journal, Water Resources Research

Peer Reviewer

- Reviewed proposal for Stanford Synchrotron Radiation Lightsource (SSRL) and NSF Geosciences program.

Leadership Activities

- Department Representative, Distinguished Scientist Seminar Series committee, Earth Sciences Division, Lawrence Berkeley National Laboratory, 2015-Present
- Working Group Member, Diversity and Inclusion Council, Earth and Environmental Sciences Area, Sept. 2015-Present.
- Session Chair, Characterizing spatial and temporal variability of hydrological and biogeochemical processes across scales, AGU Fall Meeting, 2016, 2015 and 2014. Co-conveners: Haruko Wainwright (LBL).
- Breakout Session Lead, Upscaling constructs: approaches to identify, interrogate and model functional zones and associated biogeochemical reactive transport across the genome, plot, floodplain, watershed and basin scales, SFA 2.0 Retreat, Oct. 22-24, 2014. Co-conveners: Haruko, Charu, Eric, Susan, Carl, Eoin, Patricia, and David.
- Session Co-Chair, Soil organic matter dynamics in the Anthropocene, AGU Fall Meeting, Dec. 9-13, 2013. Co-conveners: Kate Lajtha (Oregon State University), Dipankar Dwivedi (LBL), and William Riley (LBL).

Outreach Activities

- Presentation Judge, Outstanding Student Paper Awards, AGU Fall Meeting, 2016-2013.
- Community Outreach Volunteer, Earth and Environmental Sciences Area Exhibitor Booth, AGU Fall Meeting, 2015, 2014.
- Education and Outreach Volunteer, Lawrence Berkeley National Laboratory, 41st Annual Solano Avenue Stroll, 2015, 2014.
- Department Representative, Graduate Student Council, Texas A&M University, 2007-2011
- Treasurer, Water Without Boundaries, student society of the Water program, 2007-2009
- Pre-conference Volunteer, Bi-National Water Congress, Saltillo, Mexico, Nov. 2007